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AUGUST, 1925

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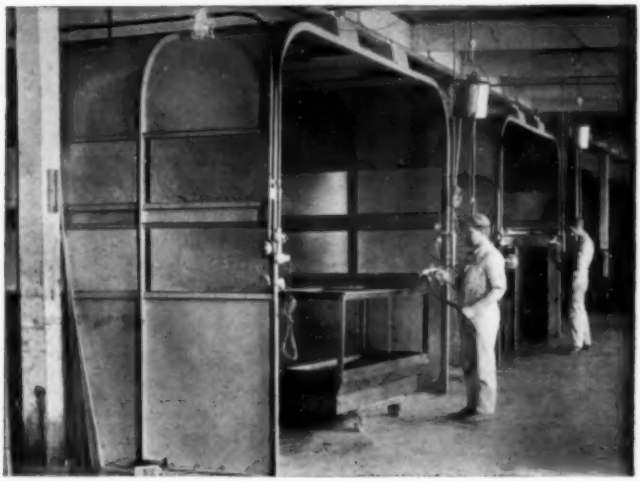

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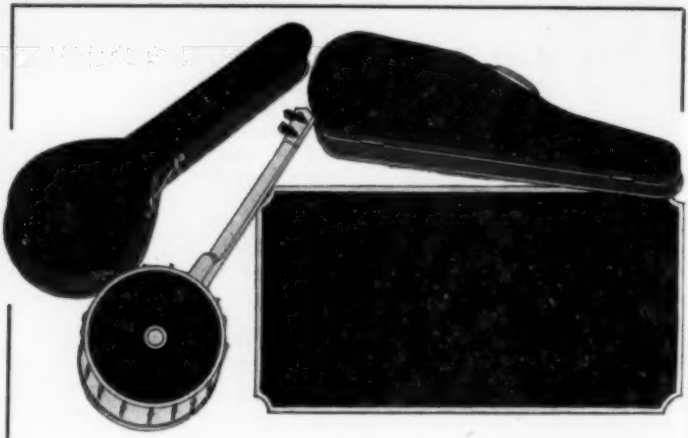

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Industrial Finishing

For Users of Fillers, Shellacs, Varnishes, Etc.

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With the Editor

REPRESENTATIVES OF INDUSTRIAL FINISHING, who meet foremen finishers and users of finishes, are frequently asked, "Who is getting out this magazine?" "Who is behind it?" etc. Apparently, in the face of evidence to the contrary, some readers of INDUSTRIAL FINISHING are under the impression that the trade journal we are sending them is the house organ of some manufacturer or group of manufacturers, or the propaganda sheet of some organization.

Such is not the case! The best proof of this statement is revealed clearly enough, and can be found by close examination of the reading columns—and the advertising pages too, for that matter. The variety in both, and the fact that no particular firm nor kind of products dominate the advertising section, and that no single class of subjects monopolizes the reading columns, makes the evidence both conclusive and convincing, when you stop to think of it.

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The journal is supported solely by revenue obtained through the sale of space for advertising. While contracts for advertising space are solicited from all sorts of legitimate and responsible concerns who have materials, supplies, equipment or service to furnish users of industrial finishes, the publishers reserve the reading columns for practical and instructive articles, suggestions, questions, communications, trade notes and news of new materials, equipment, accessories, etc. It is our aim to serve the industry without bias or favoritism. Editorially, INDUSTRIAL FINISHING carries only such matter as will be of interest and help to foremen finishers, and those individuals who are chiefly interested in finishing room management, and in the buying and using of everything that enters into finishing department production.

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VARNISHES—ENAMELS—LACQUERS—JAPANS

Space Arrangement for Finishing Department

First of a series of articles by an experienced industrial engineer who will show how modern methods prove profitable in the finishing department

By Chas. F. Scribner

MANAGEMENT as an economic function has been defined by the American Society of Mechanical Engineers as: "the art and science of organizing, preparing and directing human effort applied to control the forces and utilize the materials of nature for the benefit of man." This definition contains three words of significance to us who are engaged in industrial enterprise: organizing, preparing, and directing. These words indicate the three main phases of managing any industry.

Features of Organization.

In organizing a business we choose the site for the plant, secure the capital, select the equipment, plan the layout and arrangement of departments, and determine the number and duties of the executive staff. In other words, we set up the business machine.

Preparing or planning applies to those activities which must be brought into harmony, so that the business may function as a unit. When put into effect it works out the relationships between activities and personnel, sets up labor, purchase, and stores records, and such records as will control production and determine costs.

Directing is the administrative function which applies to the execution or carrying out of the objects for which the business is organized and for which its various activities are co-ordinated. It starts the work in the factory, insures proper training of employees, and sees that the day-by-day problems are met; in short, that men, materials, and machinery are brought together so that maximum output at minimum cost will be sustained.

Applying these factors to the layout and arrangement of the finishing department we find that we must consider first the combination of organizing and preparing or planning in order to secure the most effective results. Directing comes afterwards, applying to getting the work through the layout and arrangement which has been adopted.

Planning the Arrangement.

The first step in planning a department arrangement is to lay out a flow sheet of the processes through which the product must pass. This is laid out without reference to the specific kinds or quantities of machines or other equipment which may be required. Its purpose is to establish the relative location of processes and production centers, as an aid in the most efficient arrangement. Such a flow sheet for a bedroom furniture plant is shown in Fig. 1.

Having decided upon the flow of the product through the finishing department, the next step

is to decide upon the amount of equipment necessary at each step of the finishing process. Factors which must be considered in arriving at the correct answer to this question, are:

(a) The quantity of product to be manufactured.
(b) Capacity of the equipment required.
(c) Whether the product is to flow through in a continuous stream or in lots.
(d) The length of the working day.
(e) The proportion of time required to prepare for an operation or process as compared to actual working time.

When the type and quantity of each item of equipment has been decided upon, the actual layout of the department can be begun. This layout is best effected by means of cardboard templets drawn to scale and representing the space required for each machine, piece of equipment, and each production center. In making these templets, consideration should be given to the following factors:

(a) The actual floor space occupied by the equipment.
(b) The floor space required by the workers to handle the equipment efficiently.
(c) The floor space required around the equipment for storage of finished work before its removal, and for work awaiting processing.

These templets should be arranged on an outline sketch of the department, which has been mounted on a light board and which sketch is drawn to the same scale as the templets. In new plants it will be possible to make the layout follow very closely the flow sheet. Where an existing department is to be rearranged the most effective layout is not always possible, owing to limitations in the buildings. In striving for a direct line layout, compromise of the ideal will often be found necessary when facing particular conditions.

Elements Often Overlooked.

One element which is commonly overlooked in arranging the finishing department, is so important that nearly every other consideration may be sacrificed to it. This is provision for adequate aisles and accumulation spaces for the movement and placing of the products. As a general rule, this is not given sufficient attention, so that when the production is materially increased there is an immediate

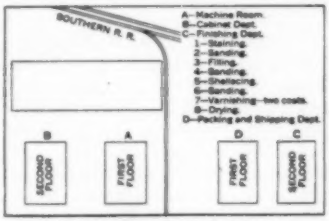


Fig. 1—Flow sheet of plant.

congestion and stoppage of the processes, due to inability to move the product at the time it should be moved.

The finishing department, to secure most economical operation, should be laid out so that the product in process moves forward continuously in a straight line from the point where it is received—the cabinet department—to the point where it is delivered to storage. Backtracking is undesirable and expensive, and de-

partment arrangement should be such that it will be avoided.

As the work of the average finishing department is a combination of progressive manufacturing and lot processing, provision must be made for accumulation spaces for certain quantities of product between operations, or there will be expensive delays and a decrease in output below capacity, with consequent increase in its cost. This is especially true in the case of operations where the product must undergo drying before it can proceed further.

Three conditions which deserve more attention than they have received in the layout and arrangement of the average finishing department, are, heating, ventilation and better lighting arrangements. Poor ventilation can easily cause a drop in output of 22 percent., while failure to properly heat the drying room has resulted in a decreased output amounting to as much as 35 per cent. Both of these conditions can be easily corrected, at very little expense.

The effect of improved illumination on production, based on extensive studies in a large number of plants, shows that an average of over 15 percent increased output can be secured with the right character of illumination, and that the cost of this improvement will be about 2 percent of the department payroll.

A Typical Example.

In Fig. 2 is shown the re-arrangement of the finishing department of a furniture plant. This department is located on the top floor of a two-story building, adjacent to the cabinet department. On the first floor is located the machine room, and under the finishing department are the storage, rubbing, packing and shipping departments.

This arrangement has been found to provide excellent lighting and inexpensive ventilation and heating facilities; the product is moved from the cabinet department without the use of elevator, by sliding along well-kept runways; and the finished product

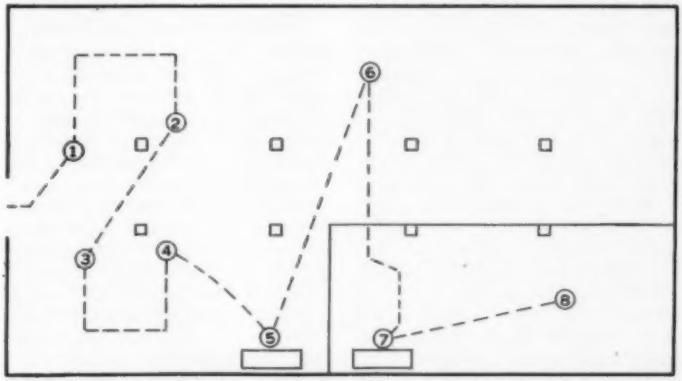


Fig. 2—Layout of finishing department. Note: To identify numbered stations here, refer to Fig. 1.

is sent down to the floor below by means of an inclined chute.

The layout and arrangement of the finishing department is a matter of great importance for economical production. It is difficult to make an estimate of the waste of time, the unnecessary effort, and the loss of money due to improper layout in the average plant. Proper layout will increase the satisfaction of the employee in his job, because he does not have to spend a part of each day taking steps and making motions that are unnecessary, and he can put more effort into his productive work.

A proper layout is important to the management because it helps to keep the quality of the product up to standard, it saves money, and it reduces the time required to process the product in the finishing department.

More Color In New Furniture.

The Grand Rapids market was full of color this season, even in the moderate priced lines. Wherever possible a dash of color has been placed on panels and flat surfaces, and it has not worked against sales. Indeed, everybody is seeking color in everything they buy. Painted furniture has gone well for several seasons, with a bit of decoration for relief, but the near limit has been reached this season.

The periods that lend themselves nicely to color are most in vogue—the Spanish, Italian, Venetian, the Louies; even the sombre Jacobean and Colonial are all more or less highly decorated. In many exhibits showing period furniture that originally carried a subdued bit of decoration, this season the manufacturer has added more color to meet the growing demand for more pronounced colorings. Nothing is gaudy, nothing inartistic, but the designers have met the demand, or rather created it, by adding to the ideas of the old masters.

Finishes continue about the same as six months and a year ago. Aside from the painted and decorated furniture, the soft satin finish leads all others, whatever the wood is.

Walnut is the heavy favorite in bedroom suites, some numbers being obtainable in either this wood or mahogany. Walnut highlights so beautifully that it continues the favorite in all of the higher grade goods and for odd pieces. Oak gradually shows an inclination to "come back", and was seen in many exhibits of Jacobean furniture. Inlaid woods are not so prominent as in other years, but are used to a considerable extent. Colonial furniture, of course, continues in mahogany. —Hardwood Record.

Protect Steel Surfaces.

Man uses in his structures, among other materials, the strongest metal he has—steel. Opposed to it is one of Nature's strongest elements — moisture-laden air. The air attacks this metal which man has transformed and tries, by what is known as rusting, to draw it back to its original state. If the metal is left to face the attack alone, it soon weakens. It crumbles, and is destroyed. Man can protect his steel surfaces with suitable coatings of paint, through which air and moisture do not penetrate.

Baked Finishes on Cast Iron

Foreman Finisher of The De Laval Separator Co. tells how to prepare cast iron surfaces for primer, filler and enamel or japan coatings, how to apply these coatings, and what desirable features should be found in them

By E. G. Burgess

ALTHOUGH much has been written about enameling and japaning in general, little has been mentioned about the difficulties encountered in finishing machines and parts made of cast iron. Cast iron requires a very elastic coating, much more so than steel, because it does not indent so readily as steel and the enamel or japan must stand the entire strain of a bang or abrasion.

Cleaning Iron For Primer.

The first consideration, of course, preparatory to coating these pieces is to have them clean —free from dirt and grease. A certain amount of sand and foundry dust clings to the iron. If the castings have been sandblasted and have not been handled by sweaty or greasy hands, they may be dipped into the primer without further process.

If the castings have been pickled and rattled, they must be washed in a solution of potash or any similar commercial cleaner, rinsed in clean water, dipped for a moment in dilute muriatic acid, washed again in clean cold water and then dipped in boiling water—this to dry them off quickly. They are then baked to remove any water that may have settled in the pores or other holes. After cooling they are ready for priming.

It will be noted from the foregoing that the sandblasting method is the quicker and better way to handle the castings, but the majority of foundries still use the pickling and rattling method without finishing with the sandblast. Rattled castings are very smooth in spots, and the dip in muriatic acid after washing raises a slight burr on these places which aids the adhesiveness of the primer coat.

Material For Prime Coat.

The prime coat should be a very elastic material. Varnish manufacturers supply this material with full instructions for use. A good material can be reduced about 50 percent with the proper thinner, without settling out, but some primers containing heavy pigments, which in some cases are as good as primer containing lighter pigments, cannot be reduced that much without settling out in the tanks. In that case, however, constant stirring will keep the pigments in suspension.

After priming and baking, the castings are ready to be machined. The prime coat may be omitted on pieces that require no filler and are not machined until after japaning. The machining operations having been completed, the castings are washed in benzine to remove grease and dirt and are then baked. They are then ready for filling.

Filler To Be Baked.

Cast iron filler that will withstand baking is obtainable in paste and semi-paste form. The

heavy paste is used to fill sand holes and other large indentations. If the hole is very deep, it should be filled twice, with a bake between. This will prevent the filler from cracking or sinking.

The semi-paste is thinned with suitable reducer and sprayed or brushed on. The spray method is by far the best, as it produces a smoother coat than the brush. After coating with the sprayed filler, the parts should not be placed directly in the oven. They should be left out until the wet appearance has practically disappeared. This prevents cracking, pin-holing and many other defects. It is at this point that the ultimate finish is either made or marred.

A good filler is one that will flow well when spraying, will not crack or pin-hole, will sand easily, and will stand considerable banging. A great many foreman finishers make their own filler, and the writer much prefers this method, but varnish manufacturers can supply very good fillers.

By making the filler on the job the difficulties of the pigment settling in the keg, and the evaporation of volatile ingredients in an opened keg are overcome. However, much of this trouble may be overcome by buying in small packages and reversing the packages at least once a week.

Proper Use of Filler.

Filler must be baked at the same temperature and for the same length of time that any succeeding coat is baked. This will prevent shrinking and puffing. It is better to bake the filler a little longer than necessary than too short a time.

The filler should be rubbed with the finest artificial abrasive cloth that is compatible with speed and quality of ultimate finish. For work that is to be finished in two coats, use No. 0-120. A coarser grade, say No. ½-90, may be used for work that is to be finished with three coats or more with a light rub in between coats.

If care has been used in applying the knife and spray fillers, the holes and pores of the iron will be completely filled, but if there are indentations found after sanding, these may be filled and smoothed off evenly with some of the stiff paste. The piece should then be rebaked and resanded.

Clean Again Before Enameling.

All sanding dust must be removed before coating. This is best done with compressed air. Special care should be taken with pieces that are to be dipped, as dust sticking to the pieces will not only mar the finish but will enter the enamel in the dip tub, thus causing the need of frequent re-straining.

The pieces that are to be sprayed can be dusted off by means of the air duster attached to the spray booth, but the greater part of the dust should be removed before the work reaches the spray booth.

Applying Enamel or Japan.

The proper enamel or japan to use as a first coat over filler is one that will flow freely when properly reduced, and will not disappear into the filler. If the coat disappears, it is an indication that either the filler is too soft or that the material itself is lacking in oil.

Some of the first coat should penetrate the filler so that a good anchorage is attained for the succeeding coat or coats, but if the filler is so soft that it absorbs

practically all the oil of the first coat, the succeeding coats will have a spotted appearance. In this case, work that could have been finished in two coats may require four and even five coats to bring it up to the proper finish. The first coat on filler is the most important (next to the primer coat) of any coat applied, and it should be watched very carefully.

The succeeding coats should give no trouble if the material is right. They should be carefully applied in the regular way, the number of coats and the amount of rubbing depending upon the finish desired.

Brushable Lacquers.

Developments in the formulation of lacquer are coming with startling rapidity. According to authorities who are in position to know, at least four large paint and varnish manufacturers are now making "brushable lacquer".

One of these has already advertised a full line of pigmented lacquers for household use which can be applied by anyone with a brush. It is said that the drying time is about half an hour, and that very satisfactory results are obtainable as to toughness and general lasting qualities of the coating.

It is, of course, too early yet to fully substantiate these statements from actual consumer experience, but much laboratory and experimental testing has been done with surprisingly good results.

Until now the "brushability" of the lacquer has been a stumbling block to popular use, but apparently the right plasticizers have been discovered and the correct relation established between plasticizer and solvent.

Lacquer has not as yet proven to be a universal substitute for paint and varnish by any means —we believe those two products will always have their place in the industrial world—but lacquer has come to stay, and the wise manufacturer must include it in all his future calculations.—Paint, Oil and Chemical Review.

Remedy for a Lacquer Fault.

I have recently noticed that some wood lacquers do not flow out and lay down as well as they should. Usually the trouble is with the manufacturer of the lacquer, in that he does not use enough high boiling active solvent to carry his cotton and gum. Sometimes this trouble can be overcome with the addition of more thinner to the mixture, depending entirely upon the thinner used.

This of course means that there will not be as heavy a coat on the work as before, but I believe that the time spent and material used in applying the extra coat, practically offsets the extra rubbing necessary when the lacquer does not lay down as smooth as it should.

In order to obtain the maximum amount of body in their products, some manufacturers have entirely lost sight of this important thing. By the addition of a little more butyl or amyl acetate or butyl alcohol, this trouble can be easily overcome and usually makes it possible to load on a heavier coat of material. —J. C. H. Jr.

New Manufacturer of Repair Material.

"Plastic Wood," for restoring or repairing carvings, moldings, and other ornamentation in finished woodwork, is now being manufactured and sold by the Addison-Leslie Co., Newton Highlands, Mass. "Plastic Wood" was formerly handled by Harrison White, Inc., New York City.

Staining, Wash-Coating and Filling

Foreman finisher explains his methods of treating and preparing surfaces of veneered and solid parts in walnut and gum dining room furniture, to make the articles ready for final coats of modern finishes

By William Peters

IN my experience of more than twenty years, I find water staining on walnut, gum and mahogany the only practical stain to use on high-grade furniture, where a clearness and depth of color is desired.

The concern with which I am connected manufactures a medium high-grade line of dining-room furniture, using walnut, combination walnut and red gum, and some sap gum. Table tops, buffet tops and ends are veneered; the drawer fronts show burl walnut faces. We finish in American walnut, French walnut and mahogany, either dull rubbed, waxed or polished, using water stains except on table fillers and inside drawers, on which we use an oil stain.

After receiving the article to be finished from the cabinet room, where it has been properly cleaned and sanded, it is ready for the finisher. As a starter, all flat surfaces are sponged with warm water, care being taken not to leave too great amount of water on the surface, only enough to dampen it evenly. Unless the veneer has been sanded very thin in some places we have very little trouble with it coming loose. If it blisters or raises little bubbles these places must be glued down before proceeding further.

The sponging will raise all loose fibers that have been pressed down by the sanding in the cabinet room. Allow enough time for drying; then sand smooth, using a sanding block with No. 00 cabinet paper for all flat surfaces that have been sponged. We do not sponge any turned parts or mouldings.

Dust thoroughly and proceed with desired shade of water stain, using any stain powder you have found O. K. I find a 3½-in. bear hair brush for large surfaces and a 2-in. for turned parts, edges and mouldings, the best.

All chairs and table bases are stained with an air brush, using same shade of stain. Allow time to dry. There is no exact length of time required to dry; the length of drying time should be determined by the finisher. He should know when work is dry enough to coat.

Now coat the surfaces with a size coat or a thin wash of white shellac. Four and a half pound cut of shellac can be cut 50 per cent. with alcohol. If this sizing coat is used too heavy it will clog up the pores and prevent the filler from filling properly. This coat, applied with an air brush or hand brush, will dry in about two hours, after which it will be ready to sand.

Sand the shellacked surfaces smoothly and evenly, using No. 000 finishing paper and being careful not to cut through edges

or stain. All turnings, mouldings and crevices must be sanded smoothly by hand, or you will never clean out the surplus filler, and dirty, muddy corners will be the result.

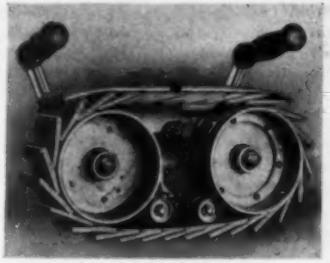
The work is now ready to be dusted off and filled. Use a paste filler, thinned with benzine or a good grade of gasoline. Do not make this filler too heavy, as the use of overly heavy filler is only a waste of filler. The filler should be about the consistency of a medium paint. Apply once with the grain, then brush across grain. This will help pack the filler into the pores of the wood.

Allow time for filler to flatten; then wipe or pack, using moss or sea grass, and wiping across grain first, then with grain. Clean the remaining filler off with cloths; remove it from corners and crevices with a wooden pick or cleaning brush. When using a cleaning brush, be careful not to brush all of your filler out for an inch or so around corners, crevices and mouldings. Otherwise such places will show up badly when the article is finished.

Now wipe thoroughly with clean cloths. If you have done your work carefully it will not need a second filling. After drying at least twelve hours it will be ready for the final coats.

A New Rubbing Machine.

Appearing in the accompanying cuts are views of a new type of portable machine for rubbing to a smooth finish, newly varnished and lacquered wood or metal surfaces. The rubbing unit of this machine is something of an innovation, in that it carries the pads continuously in one direction only, instead of



A close-up of the rubbing unit.

reciprocating them back and forth in imitation of hand rubbing.

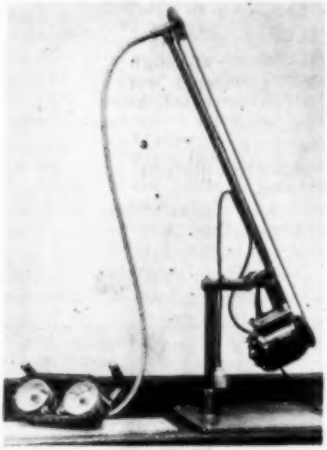
Reference to the close-up view of the rubbing unit shows that the felt pads are attached to an endless belt (a phosphor bronze belt) in an overlapping fashion. The belt runs over two ball-bearing pulleys. The speed of the belt travel, although fast enough to insure rapid work, is not so fast as to cause any "burning" of the surface being rubbed. The rubbing unit weighs 7 lbs.

The natural outward "spring" of the metallic belt, while in mo-

The complete machine in service.

tion, causes the active felt pads to be pressed firmly against the work, between pulleys, but to supplement this action of the belt and to prevent all possibility of an upward sag of the understrand, four small pressure rolls are provided as shown in the close-up view.

The driving pulley of the unit has a central toothed section which engages a spur gear at the end of the flexible driving shaft. The other pulley of the unit is mounted on an oscillating shaft.



Bench type rubbing machine for furniture parts, cabinet work, etc.

The portable stand for the motor and shaft support is a tubular column resting in a heavy iron base provided with ball-bearing casters. At the top of the column a swivelling and pivoted arm, which is free to move in all directions, carries at its long end the support and driving pulley for the flexible shaft, and at the short end the driving motor.

When not in use, the rubbing unit is placed in the work tray located at a midway point on the column. By means of an extension cord the machine can be connected up to any electric light switch. The motor is started and stopped with a pendant switch hanging from the pivoted arm. This machine is manufactured by the A. and T. Co. Inc., East Orange, N. J. This concern has also developed a bench type machine for rubbing furniture parts, etc., which is now being introduced to the woodworking trade.

Railway Coach Painting.

In the coach painting department at the Central Railroad of New Jersey shops, Elizabeth, N. J., master car painter William G. Hoffman still adheres to the fine old practice of applying, in the case of a sandblasted steel car, one coat of primer, one coat of filler and three or more coats of roughstuff. These coatings are all rubbed out in due course with waterproof sandpaper dipped in water.

This yields a surface of detailed refinement for the color and varnish coats to follow. Two coats of Pullman car body color are applied and given the protection of two coats of wearing body varnish.

All lettering is applied in gold leaf. Headlinings are being painted cream color striped and ornamented with gold leaf; then varnished, and later given a rubbed effect to conform with the finish applied to the wood interior. All steel coaches of this road are supplied with wood finish on the inside, this wood being mahogany varnished and rubbed to a dull effect.—The Painters Magazine.

Auto-Body Lacquering

Explaining a number of interesting and valuable features about the lacquer finishing of automobile bodies, to obtain various desired effects with modern materials

By W. H. Martindale

IN SPRAYING lacquer materials it should be borne in mind that the air must be clean and absolutely free from oil and water, or very unsatisfactory results will be obtained. The air line should be tested daily by blowing some of the air on the palm of the hand to make sure that no oil or water is getting through to the spray gun.

Two-Color Work.

In blocking off certain portions of the body to do two-color work, it is advisable to use two or more thicknesses of paper so that the top thickness can be torn off, exposing clean paper which will readily absorb the water when it is desired to remove the paper. Otherwise, if only one thickness of paper is used, the coat of lacquer material makes the paper waterproof, and it is very difficult sometimes to soak off the paper with water.

Paper should not be applied to the lacquer enamel until several hours after the last coat has been put on, or there will be danger of the glue or paste causing some of the lacquer to adhere to the paper, resulting in small, pulled-out spots when the paper is removed. Ordinary library paste or a cold water and flour paste is satisfactory for this work. Some people use glycerine, vaseline, lubricating oil or a greasy material of this sort for preventing the lacquer from sticking where it is not wanted. This is satisfactory in every way, provided extreme care is taken not to get even the faintest trace of the grease or oil on the parts that are to be coated with lacquer; if grease or oil is present the lacquer will not stick.

Repairing Damaged Spots.

In repairing damaged spots it will usually be found more advisable to put on the required number of coats on the damaged spots, to bring up the surface to a uniform level with the remainder of the body, and to give the desired color. Then apply one coat of the color over the entire damaged panel, so as to eliminate the partially dry overspray which will usually be found when attempting to repair a spot only.

In some cases this overspray can be eliminated considerably if, immediately after the last coat of lacquer enamel is applied, a coat of clear reducer is put on. This reducer will soften up the partially dry lacquer in the overspray and blend it down with the color already on the job. In some cases repair work can be done entirely in this way without the necessity of putting a coat over the entire panel. Each case will have to receive the treatment that experience shows best for that particular type of repairing; no set of rules can be made for doing this work.

Where a special color not readily securable is desired, it can usually be obtained by blending two or more shades of lacquer enamel together. In case it is

impossible to do this a small quantity of japan colors can be added for tinting purposes.

Clear Lacquer Over Colored.

The question of applying a coat of clear lacquer over lacquer enamel is one that often comes up. The actinic rays of sunlight have a very bad effect upon clear lacquer, causing the gun cotton to undergo a chemical change. This effect is lessened greatly by the addition of pigments; that is the reason colored lacquer enamels will withstand outside exposure much better than clear lacquers and for this same reason it is not advisable to add clear lacquer to the finishing coats of lacquer enamels, nor to use a clear lacquer coat over the lacquer enamel.

Where high luster is wanted it can be obtained very easily by first rubbing to a surface and then applying a coat of practically clear reducer, followed by polishing when dry.

Varnish Over Lacquer.

There is a great deal of controversy regarding the advisability of using a finishing varnish over lacquer enamel, where a high luster is wanted. This is not recommended for two reasons. In the first place all of the lacquer solvents do not evaporate from the lacquer enamel until a considerable time after the enamel has been applied and if these solvents are not entirely evaporated before the finishing varnish is put on, they will act as paint and varnish removers, rotting the varnish as they evaporate out through the varnish film.

In the second place, even though all of the lacquer solvents might be gone from the lacquer enamel coats before the finishing varnish is applied, durability of the finish will only be so great as the durability of the finishing varnish itself; it has been proved time and time again that properly constructed lacquer enamels will have at least two or three times the durability of the best grades of finishing varnish. It is the outside surface that must withstand the action of the weather, and if this surface is lacquer enamel it will resist the weather action much better than a finishing varnish would.

To Obtain High Luster.

Where a high luster is desired it can be obtained on the lacquer enamel itself by rubbing and polishing methods. When a high luster is once obtained, lacquer will hold this polish almost indefinitely, whereas when finishing varnish is used, the luster will begin to die out soon after the job is exposed, and will continue to deaden until eventually its life is all gone.

A Modern Finishing Room.

The finishing department of the S. A. Cook & Co., Medina, N. Y., includes a floor space of 84x102 ft., on the top story of the firm's new fireproof building. Provision for keeping the air

Applying finish with spray gun.

A view in the staining room.

clean, keeping it moving and keeping it supplied with the necessary humidity, is assured through the sprinkling of the floor every three hours and through the operation of ceiling exhausters.

Both the dip tank and air brush methods of applying finish coats are employed. Stains are applied by dipping, and varnish coats are put on by spraying with modern air-brush equipment.

Water stain solutions, made with stain powders selected because of their proven lasting quality and color characteristics, are used. The stain solutions are prepared in earthen vessels at temperatures close to 160-degs. F. Stains are mixed in standard lots for which fixed measures are specified. Particular care is given to obtaining accuracy in these measurements, so as to insure uniformity in the strength and color of stains. Stain solutions are maintained at luke-warm temperature in the dip tanks, as this gives more satisfactory results in the absorption of stain by the wood and in the draining of surplus stain off the dipped articles. Needless to say, all parts are carefully dusted before being dipped in stain.

Immediately after the dipping and draining process, the pieces of furniture are placed in rows on the floor to dry thoroughly. The temperature of the room in which this takes place is maintained at 80-degs. F.

In the application of varnish the foreman insists upon a thin even spray of varnish slightly warmed, as he declares this gives a much better finish than would be possible with a heavier flow of cooler varnish. The thin coat is sufficient to cover the surface when expertly sprayed, and it dries much more quickly.

Speaking of the importance of the finishing process, Mr. George Bowen, president of this concern, says: "No piece of furniture can ever expect to win lasting respect and bring repeat orders if it has not been properly finished and thoroughly dried before being shipped."—R. J. Waldo.

Finishing Lamp Shades and Bases

Descriptions of materials and methods employed in the decorating and finishing of attractive shades, pedestals and bases for modern table and floor lamps in many styles and designs

By F. C. Broadhurst

IN THIS electrical age table and floor lamps have become important accessories in the furnishing of living rooms, libraries and dens of homes, and for imparting an atmosphere of cheerfulness and luxury in modern club rooms, lounging rooms, lobbies, etc. These lamps are made in many designs and decorated in various colors, shades and blendings of colors. The finishes and methods used to obtain the decorative effects on modern lamp shades, pedestals and bases are especially interesting.

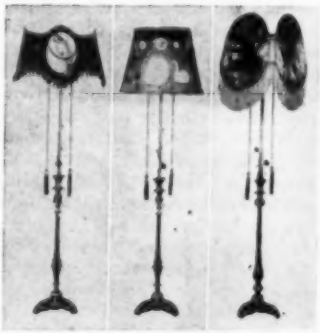
Cloth Shades Glace.

Several different grades of cloth are used in lampshade manufacture ranging from ordinary cheesecloth to finer fabrics. After being cut the cloth is sewed to the frame and the whole is rolled or dipped in a special varnish, outside and in. If the fabric is smooth, the shade takes on an amber, glass-like tone; if coarse, the threads stick out in the manner of Turkish towelling and yield a more softly diffused light.

One or two coats of varnish may be applied according to the quality of shade, 24 hours being allowed before recoating or packing. Ordinary varnish is not used. A special type is employed that top dries instead of drying from the bottom out, as is ordinarily the case. Both the rough and the smooth finish is hand decorated in most instances, either in free hand designs or stencils shaded and filled in. The work is usually done by an artist using oil tube colors.

Cloth Shades, Crystal or Beaded.

The method is the same as given above except that after the decoration a further coat of varnish is applied, which while still wet is rolled on a bed of ground glass, mica or clear smaltz. When the varnish has dried, the excess is brushed off and the resulting finish not only diffuses the light agreeably but softens the outlines of the decoration and gives it a misty appearance.



Polychrome Lamp Bases.

The wood is usually poplar or basswood to which a sealer is first applied consisting either of colored shellac, or whiting, dry Venetian red and glue. Over this is brushed japan gold size; then the gold leaf is laid on and burnished with the tool. The parts

to be polychromed are next colored with colors in oil, usually bright greens, reds, blues and yellows followed by an antique glaze over all.

The antique glaze is composed of equal parts of burnt umber and Van Dyke brown in japan, reduced to glaze consistency with turpentine. While wet it is wiped off of high lights and into deep parts, and as soon as dry it is protected with a spray coat of lacquer or rubbing varnish rubbed dull.

Natural Finish Lamp Bases.

The woods are customarily walnut or mahogany, and the finish is most economically turned out on a lathe. When porous end grain is encountered it should first be sealed to prevent the stain taking dark at these points. If oil stain is used the sealer may be one part raw oil to 16 parts benzine; for water stain a thin glue size. Both are applied with a brush or sponge to the end wood only.

The base is mounted in the lathe and sanded smooth while revolving at a good speed. It is sanded first with a coarse paper against the grain, then with a fine sandpaper with the grain. If it is to be water stained (desirable with mahogany) the wood is sponged with clear warm water then sanded down smooth again and stained while the lathe revolves at medium speed. Where oil stain is used no preliminary water sponging is necessary.

The wood is now ready to be filled. The filler is reduced from paste form to a cream consistency with benzine, and applied along the grain with a bristle brush, while the lathe revolves slowly. In about 20 or 30 minutes, when the filler has flatted, wipe off the filler against the grain with burlap or sea moss so that the filler packs well into the pores.

In 24 hours varnish may be applied and rubbed dull or polished while the lathe revolves swiftly, or lacquer may be applied without rubbing. When rubbing or polishing, the felt pad that holds the pumice or rottenstone and oil, may be held against the turning while it revolves swiftly. The effects are readily observable by simply moving the pad to one side without wiping off the slush. This is very largely thrown off by the speed of the lathe.

If a wax finish is desired apply a thin coat of shellac over the filler, melt up a little paste furniture wax and hold against the revolving base on a cheesecloth pad. In about an hour polish and apply additional coats at the same interval, as desired. If it is desired to highlight the oil stain, hold a soft cloth against the raised parts while the stain is still wet; if water stain, wait till dry, then use fine sandpaper. In both cases the pressure should be light and graduated carefully from light to dark.

New Lacquer Book Free.

The Glidden Company, Cleveland, Ohio, manufacturers of all types of products for finishing either wood or metal, have recently issued a very complete booklet "The Finishing of Wood", which tells in detail how to secure a quality finish on wood with Glidden Stains, No. 400 Paste Wood Filler, and No. 35 Wood Lacquer. The booklet is divided into six parts as follows:

Introduction.
The Story of No. 35 Wood Lacquer.
The Use of Stain under Lacquer.
The Use of Filler under Lacquer.
How to Use No. 35 Wood Lacquer.
How to Avoid some Lacquer Troubles.

A copy will be gladly sent to anyone interested who will send their name and address on their company letterhead, to The Glidden Company, Cleveland, Ohio.

Finishing Refrigerators.

There are several things to consider when one has in mind the finishing of ice boxes and meat display cases, or in fact, any furniture that will be exposed to dampness. One thing of great importance is that the finisher must give his work plenty of time to dry. If he has a room in which he can run the temperature up to 100-deg. F., it will help get results quicker and better. This heat will not injure the wood if it has been thoroughly dried and kept dry during the manufacturing process. Five or six hours at 100-deg. F., with ventilation, will do more than 15 hours at a temperature of 70-deg. F. Drying finish in such a room, properly conditioned, will insure uniform results the year round.

Don't ask for something more rapid in the way of varnish drying, if you desire good work; if you ask for it the varnish man will probably supply you with a quicker-drying varnish, although he dislikes to do so. If he doesn't, someone else will. I hear so often, "Have you got something that will dry quickly?" Well, a quick-drying varnish is all right in its place, after all, but I believe it is unsuitable for ice boxes.

Our friend wants something that will dry quickly and penetrate, too; it is like a man wanting to be in two places at once. If a varnish is to penetrate, it must be allowed sufficient time to do so. The amount of varnish penetration depends upon the thinner, and as soon as the thinner is gone, the penetration of varnish stops. Moisture will get in at the ends and travel in the grain until it swells the wood and breaks the varnish. Then more moisture is admitted and more evidence of the damage appears.

I would seal all exposed or partly exposed end grain with a good coat of white lead. Take the lead as it comes ground in oil and break it up in some good floor varnish; have it thick, and apply with a stiff brush to all ends, that are not glued together with a waterproof cement. After brushing and pressing the white lead into place, wipe off with a rag the surplus which is forced out so that when finishing inside, it will not work up.

Then there are the stops for openings. These should have a good coat of floor varnish before being put on, and they should be allowed to dry partly anyway. Little places that are recessed for hinges should be well coated before hinges and locks are put on. When setting in glass, be sure to put a little varnish around the edges of the glass. This will help the putty to stick to it. If you use ordinary putty, add one-third white lead ground in oil; this will improve it if you are having any trouble with the putty. Apply putty while varnish is tacky on glass.

Now we are ready for a coat over all the inside. You could not do better than give it a coat of the best floor varnish thinned with one pint turpentine to the gallon. Be sure to get tops and bottoms of doors and all movable parts. If the wood is warm and dry, it will "drink" this finish in quickly, so it is out of sight; you may think your labor is lost but not so. You are just "putting one over on Mr. Moisture" by getting there first. Let this dry at least 24 hours if it is not forced with heat. Follow with a coat

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To Readers Of

Industrial Finishing

You have long been looking for an independent journal devoted exclusively to practical finishing and you have, no doubt, visualized the kind of articles you would like to see printed and illustrated in such a journal. Perhaps you have felt prompted at times to write up some of your own experience, or to ask some questions about problems that come up in your work. Now is your opportunity. Here is a journal designed especially to meet your needs and to suit your convenience.

Kindly express yourself by filling out and returning the form below.

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of waterproof varnish, with enough aluminum powder mixed in to cover well.

Mix aluminum with a little turpentine or benzine before adding to varnish. Thin to your liking to work. Two coats of this will be better than one; the dampness cannot get past the aluminum. If properly applied and mixed, it seems to come to the top and saves the varnish that is holding it on. I often think it is like the shingle and the nail; one is not much good without the other. Now you have a foundation for white enamel or anything you like. Thin coats well soaked in and allowed to dry, always give the best results.—Thos. Bezzo.

Fillers For Use Under Lacquer.

Both the maker and the user of wood fillers have been going through a period in the last year or so that has, perhaps, been the most interesting of any period in many years.

This has been brought about by the increased use of lacquer on the part of the trade, and by the general desire on the part of everybody to make tests with lacquer finishes over their work.

The fact that lacquers in general differ so much, one from the other, has made it extremely difficult for the filler manufacturer to adapt his material to conditions.

The general trouble seems to be the turning gray of the filler in the pore and this, of course, is caused by reaction between the liquids in the lacquer and the materials out of which the filler is made. This trouble has lead to a great deal of experimental work and the development of new fillers which are better adapted for use under lacquers.

The turning gray of filler, while it is more prevalent now than it has been in years, is not a new thing by any means and occasionally in the past, due to climatic conditions in combination with certain properties of shellacs and substitute shellacs, the same trouble has been in evidence.

Unfortunately the manufacturer of wood finishes has not a very wide latitude in the use of materials in this filler. He must necessarily be restricted by materials which will fill well, dry well and work well. Undoubtedly there will be cases found with some lacquers where any of the fillers on the market will not work well with them.

It is very desirable that lacquer manufacturers and filler manufacturers conduct their research work with thorough understanding of the problems of each other and in full sympathy with those problems.—*Marietta Message*, Marietta Paint & Color Co.

Enters Consulting Field.

Wm. J. Miskella, M. E., for a number of years Chicago branch manager for the DeVilbiss Mfg. Company, has resigned his position to go into the consulting field, with office and laboratory at 1164 West 22nd St., Chicago. He will specialize in lacquers and lacquer finishes and their application. Mr. Miskella is the author of a book on Japanning; also President of the Lamberson Japanning Company.

Paasche Opens Branch in Toronto, Canada

The Paasche Air Brush Co., 1909 Diversey Parkway, Chicago, announce the opening of their new branch office in Toronto, Canada, at 529 Ossington Ave. Mr. L. E. Leonard is in charge. This office will now handle their Canadian business with a complete line of compressed air devices, from the delicate artist's air brushes to the large batteries of industrial air finishing equipment.

Industrial Finishing

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AUGUST, 1925

A Fire Hazard That's Always Present.

A moment's consideration regarding the highly inflamable qualities of so many modern finishing materials and supplies, and accumulations of waste from the use of these materials, is a reminder of the fire hazard always present wherever finishing or painting is being done, and wherever waste from these materials is allowed to remain.

While this ever-present hazard cannot be entirely eliminated, it can be greatly reduced by enforcing suitable precautions against the possibility of a fire starting. In addition to the usual "No Smoking" rule and the perfunctory practice of average cleanliness, there should be means provided for establishing a condition of greater cleanliness, not only on surrounding surfaces but in the air as well.

Among the precautions that should prevail in every finishing and paint room, the following are especially important:

Storage of inflamable materials in a separate fireproof building or in fireproof containers in or near the finishing room; absolute cleanliness of outlets in containers of liquids; use of waste pans under spouts and faucets; the immediate recovery and utilization, or the collection and destruction, of waste materials; maintenance of floors, walls, posts and ceilings in good condition and with smooth surfaces so they can be easily kept clean; the use of exhaust or ventilating fans other than those in the spray booths, to make the room air cleaner, safer, and healthier for employes; and complete cleaning of spray booths, spray guns and hose, material containers, dipping vats, tumbling barrels, drains, supporting racks, rubbing machines and drying rooms.

This cleaning should be made as much a duty and obligation as anything that prevails in the factory routine. Cleaning time should come regularly as surely as lunch time at noon, or quitting time in the evening.

During the cleaning process, or promptly after cleaning, the waste matter should be deposited in metal containers and transferred directly to the place of destruction—usually the factory fireroom. Never leave this waste matter stand long, even though it is in a metal container. An accumulated bulk of this waste material is far more liable to take fire of its own accord than were the scattered accumulations before they were disturbed. The cleaning job is not complete as a work of safety until this waste material has been put where it can do no harm. Collecting this waste matter into a form in which it is even more dangerous, then transferring it to another part of the plant, and leaving it there to explode or catch fire quietly, is not safety practice.

Interruptions Are Costly.

A certain amount of time is entailed in interruptions of one kind or another about modern finishing operations. A man who has started a certain process ordinarily will have it well in hand; he has given it the required preliminary study and planned how he will complete it. Take that man away and direct another to follow where he left off, and you are making for a loss of time, effort and money.

The second man, of course, will himself have to get the situation well in hand; either he will have to ask the preceding operator for definite instructions, or turn to a superior. Besides this, in the case of important operations demanding accuracy and much figuring, he will have to apply close thought to the process before actually beginning work. All this makes for waste.

Wherever possible, finishing foremen should see that a given operation is completed, uninterrupted, by those starting it. Many times, changes near the noon hour only make for much waste. A little forethought will often allow a given operation to be terminated before twelve o'clock, and thereby save a great deal in time, labor and material. Interrupted and untimely changed operations are to be discountenanced, because they make for much spoilage of work and divers losses in other ways.

Machines Improve Work and Workmen.

It is as unreasonable to state that machines are displacing human skill in workmanship today, when spray guns and mechanical rubbing machines are taking the place of hand brushing and hand rubbing pads, as it would have been to have made a similar statement centuries ago when brushes and pads replaced bare hands for smearing on and rubbing smooth the ancient decorative coatings. Only the actual mechanical means of applying coatings and smoothing the surfaces have been changed.

Whenever a machine, working under human direction and control, is placed in service, it promptly takes away the drudgery from some of those monotonous jobs of repetition work which not only narrow men mentally, but which sometimes wear them lop-sided physically.

The operation of spray guns and rubbing machines requires not only men with acquired physical skill, but men of balanced judgment—in other words, men of brains. This fact is demonstrated daily in every modern finishing room. No manufacturer finds men of the calibre he wants for this work, any too plentiful. Even the dipping and tumbling operations can not be entrusted to ignorant, or inexperienced, or careless workers.

As a matter of fact, there occurred a great improvement in industry when those fatiguing, monotonous jobs, which so often induced a dreamy, tired feeling mental condition in workmen, could be performed with labor-saving apparatus that works so swiftly it must be skillfully guided and attentively watched every minute. The rapid manipulation of modern finishing equipment has a stimulating effect, and it develops in the workman a degree of alertness that becomes useful to him in many activities other than those at the factory.

Period Finishes—Adam Brothers

With the favored classic note prevailing alike in outline and ornamental detail, the hand of the architect is seen in the creations of these famous brothers

By R. J. Meade

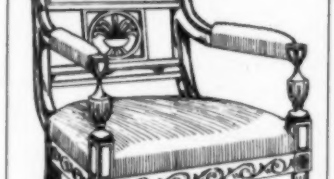
WHEN William Adam, leading Scottish architect of the early 18th century, set about training his four sons in the same profession he little foresaw to what heights of world fame they would ultimately rise. Upon reaching their majorities, the two eldest, Robert and James, formed a partnership and once in London were soon able to attract attention. It was during travel on the continent, particularly amid the newly excavated portions of Pompeii and Herculaneum that they sought and found the classic inspiration which is the hall mark of their work.

That they should acquire a name as furniture designers as well as architects is due to the fact that enthusiastic clients insisted upon their carrying their ideas into the furnishing as well as the building of residences. However, in this respect, they remained designers exclusively, leaving the actual work to be executed by practical cabinet makers like Chippendale and Hepplewhite.

The characteristic Adam sideboard shows massive end cabinets surmounted by Greek urns, console tables supported by square grooved columns, book cases, with the miniature proportions and cornices of a public building.

Adam decorations were applied with restraint and represent the extreme of delicacy and refinement of detail. The favorite themes for these carvings, comprised the acanthus, egg-and-dart and beaded moulding, oval and round sun bursts, vases, wreaths and festoons of ribbons and leaves. Ordinary carving was executed in wood, finer work in composition, both glued on to the piece prior to finishing.

Like their contemporaries of the Georgian period, the Adam Brothers favored mahogany, but with greater emphasis on the matching of selected veneers. Satinwood was also employed—not just for inlay purposes but as a base for decorative panel painting and often for the entire piece. Natural sycamore, too, found occasional employment, sometimes stained chemically to a delicate



Squareness of design is characteristic of the Adam Brothers

greenish color to which the name *harewood* has been given. Pale green, ivory and white or gilded furniture was customarily constructed of pine or lime wood.

Adam furniture today is produced almost entirely for the living and bed room, being executed impartially in mahogany, walnut and enamel. It is characterized by squareness of design, double fluted legs on dining room tables and beaded mouldings with festoon ornamentation on bed room suites. Occasional living room pieces, usually consoles or cabinets, are met with in some cases decorated with painted floral designs, in others with inlay.

Although original Adam pieces (other than sycamore) were not stained, most modern furniture of this style is treated with an Adam Brown stain that is almost standard in shade. The water is preferable to the oil stain followed by a red mahogany filler and finished off with shellac and varnish or lacquer, dull rubbed to conform to the lustre of original examples whose gloss had faded with the passing of years. Adam designs in walnut are stained to an approximate American Walnut shade with water or oil stain, followed by walnut filler, shellac and the protective coatings specified for mahogany.

For an enamel finish a coat or two of flat undercoater carefully sanded is followed by a coat of gloss enamel rubbed down with pumice stone and oil or water. Striping is executed by hand with colors in oil or japan as are floral decorations, unless transfers are used. Semi-gloss enamel may be used to save rubbing down but the effect will not be as fine unless flat or rubbed varnish is used as a final finish over decorations and striping. An antique glaze made up of Van Dyke Brown and Burnt Umber in Japan reduced to wash coat consistency with turpentine is usually applied after the striping and decorative painting, wiped off at the sides or in the center, according to design.

Thomas A. Edison says: "The great trouble with the world today is that people refuse to take the time and the trouble to lay solid foundations."

Furniture Patchers
like this Electric Furnace
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$2.00 extra for red light current heat indicator attached. F. O. B. Chicago.

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Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Fumed Oak Finish?

We would like to know how the Stickley No. 2 fumed oak finish is made and where we could buy the material. We could send sample if necessary.—H. M. & F. Co.

Practically all wood finish manufacturers can supply the Stickley fumed oak finish color referred to, which is made up of a toner, followed by a stain, and will be glad to send panel samples on request.—I. F.

Lacquer for Show Cases?

We have noticed with interest several articles appearing in the May issue of your publication, and are just wondering whether you have any data in your possession concerning the relative difference in cost between lacquer and varnish finishes on store furniture, such as wall cases, floor cases, etc.

Any information you can supply on this subject will be greatly appreciated by—Q. S. C. Wks.

So far as they have come within our observation, makers of store fixtures have been extremely slow to adopt lacquers, but as this was at the start also true of furniture manufacturers, it does not necessarily mean that they will not eventually come to it. However, it does make it difficult to gather any such statistics as you inquire for, and as a result we will necessarily have to be general.

Under advantages may be placed the fact that lacquers are impervious to moisture, will not crack or craze, do not scratch white, or print, or become dull and shabby in time, as will even a good varnish. Furthermore, they may be applied very quickly—in fact three coats may be applied in a day, and any fear of the work being marred by the settling of dust, and chilling or blooming of varnish is eliminated, as lacquer dries out of tack in less than 15 minutes.

To list the disadvantages, most lacquers, at least as developed up to this writing, must be sprayed, which means the installation of equipment. Inasmuch as large fixtures are set up complete for finishing, this would render either a portable apparatus necessary or a booth large enough to accommodate long sections. In either case a fan would have to be installed to carry away the fumes.

In cost, good lacquer runs from $2.25 a gallon in drums up to $3.00, with thinner at around $2.00, which would make the material cost higher than varnish. It is also risky to attempt applying lacquer over an oil stain, even where a coat or two of shellac intervenes. But in the case of red mahogany, a water stain must be used anyway if permanence of color is desired.

From the above general remarks you can see that if you already have spray equipment for varnish, a switch to lacquer will not involve a great deal of trou-

ble, but if not, a considerable initial investment will have to be taken into consideration. However, the furniture factories have found that this was more than offset by the greatly increased speed of finishing.—I. F.

Treating Sheet Zinc Signs.

We would like suggestions for the best method of treating sheet zinc of 7/64-in. thickness before painting, to make the paint stick.

We will use a coal-tar paint. We have experimented some by dipping the sheet in a saturated solution of copper sulphate. This removed all grease and left a good rough surface for the paint. Can any one suggest a better method? The signs are to be used outdoors.

For ten years we have used this paint on electro-galvanized signs with excellent results, but are not sure of the result when the solid zinc plate is used.—T. I. S. Co.

The very best method of putting zinc into condition for painting is unquestionably to expose it to the weather for at least a few months. The action of oxygen and rain water seems to form a rough surface free from grease and with an excellent paint "tooth".

The chemical treatments vary in method, but in purpose all represent attempts to produce artificially and quickly what the weather accomplishes naturally over a longer period. A description of the various solutions follows:

1.—Mix one part muriatic acid with four parts water by volume. Apply freely but do not allow it to remain on too long, or the zinc may be dissolved.

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2.—Apply an ammonia solution as strong as the operator can stand it.

3.—Wash the surface with naphtha or benzine and follow with a solution of 6-oz. copper acetate to the gallon of hot water.

In every case paint should be applied as soon as the surface is dry, and all chemicals used should be kept in earthen crocks or glass bottles. They should be applied with burlap or coarse cloth, or with a soft flat brush. The operator's hands should be protected by smearing them well with linseed oil.

A mechanical method of treatment is offered by the sand blast which does the work quickly and efficiently. The metal is roughened and offers an excellent "foothold" for the primer coat, which should be applied immediately inasmuch as the sand renders the metal extremely sensitive to rust where the thin zinc coating is broken through. If you have a great deal of this work it will pay to investigate the cost of this equipment.—I. F.

Waxing Hickory Handles.

We have, for some time, been trying to secure a grade of wax for waxing hickory handles such as we make, that will produce a high lustre, and one that will last. There are such waxes on the market, but evidently we have not been able to get hold of the right kind, therefore are writing in hopes that you might be able to put us in touch with some manufacturer of this material.

Our handles are sanded smooth on sand belts, and are waxed by rubbing a cake of wax on a waxing belt, which belt is made the

same as a sand belt, except that the surface of the belt is coated with granulated cork instead of sand. The friction melts the wax onto the belt, and the handles are then applied to the belt and the wax melted onto the handles, which also results in a high polish. The wax we now use gives the handles a good polish, but fades out in a few weeks' time.—F. F. S.

Practically any wax manufacturer can supply you with the proper material, as it would seem that your difficulty was brought about by attempting to use paste wax. The best thing for you would be a good Carnauba wax in lump form, samples of which you can no doubt secure from any of the wood finish manufacturers advertising in this journal.—I. F.

Enameling Glass Vases.

To finish the insides of glass vases as referred to by B-D. Co. in July issue, use lacquer enamel just as it comes from the container, pouring the quantity estimated to be sufficient into the vase. Shake and roll until the inside is well covered and pour out surplus into the next vase. If you desire to finish the mouth, use lacquer enamel with brushing reducer and apply with a brush, or thin with spraying reducer and apply with a small artist's spray.—C. E. F.

During the war we varnished the insides of shells in two different ways, either of which ought to answer in this instance. Our first method was to pour a quantity of varnish in the shell, then turn the shell so that the varnish would cover the whole of the inside surface, then pour the

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surplus out. Then a spray-gun was invented specially for this purpose. Many used this gun successfully, but in the plant where I was we preferred the former method as we thought it gave a more uniform coating to the surface.

I see no reason why lacquer enamels cannot be applied to the inside of glass vases in the former way. As an experiment I have tried ordinary lacquer and I find that by allowing just the right time to drip, or drain, a good coating remains.—M. K. Meekin.

Making Cabinets Mahogany.

We are contemplating the manufacture of radio tables and radio cabinets, etc. We thought of using either cottonwood, poplar or red gum; can you suggest the proper method necessary to bring about a high-class mahogany finish?—I. W. P. Co.

We believe you will find, as have other manufacturers of radio tables and cabinets, that gum or birch is far more satisfactory than either cottonwood or poplar. The last two woods named are very porous and spongy with the result that the finish is greatly soaked up, giving the effect when completed that there is very little body to it. The same number of coats on gum, on the other hand, would give a very much better effect.

You do not state whether you have red or brown mahogany in mind. If the former, we suggest a water stain with a second application of the stain on sap streaks. Then sand smooth all over, shellac, sand lightly and finish with a coat of coach varnish followed by flat varnish, or a coat of rubbing varnish rubbed

dull or polished as well, according to the luster desired.

If an oil stain is used sap streaks are apt to turn dark, thus marring the appearance of the finish. This would not be so bad with brown mahogany, as this is dark anyway, and you could very probably get a good effect with one coat of oil stain which would also eliminate the necessity of sanding.

Please understand that the same finish can be applied to cottonwood and poplar, but it will probably take at least an extra coat or two of shellac or varnish over what is required for gum.

As a final finish over shellac, clear wood lacquer may also be used. Two or three coats may be required, but as each one dries very quickly you could probably apply them all in one day, packing and shipping the next day.

If you would like to see just what can be done, why not send samples of each of the three woods to a wood finish manufacturer and let him build up the finish for you in the effects which most appeal to you? You can then judge for yourself.—I. F.

Fir and Gum Table Finishes.

We are making tables, using fir veneer which we wish to stain an Early English or Adam Brown. These tables are shipped knocked down, and to avoid marring we wish to give them a flat finish, using two coats—a coat of stain and a flat coat. Will you kindly advise what stains can be recommended for this? We wish to dip or brush the stain on; we do not want to use a water stain.

We are also making a table, using gum veneer which we wish to stain a dark brown mahogany, using two coats over this. Will

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you also give us your recommendation on this? We will give these tables a flat finish.—K. T. Mfg. Co.

Referring to the above, we recommend aniline penetrating oil stains for the fir veneer. These may be secured from any reliable stain manufacturer in the standard shades specified. They may be brushed, or reduced with benzine for dipping, but we recommend the former method of application, wiping off the stain wherever any heavy deposit is noted.

You must then apply a coat of shellac, from 3 to 4 lb. cut, after which flat varnish may be safely applied. A varnish should never be applied directly to an oil stain—the only way out would be by the use of a water stain which would entail sanding. A spirit stain would also raise the grain, though not as much as a water stain.

The same method would apply to the gum veneer tables.—I. F.

Tumbling to Enamel Handles.

Referring to the inquiry of the K. Handle Co. in July issue, we are not surprised at the difficulty in getting a tumble finish with enamel, whether lacquer or oil, as we do not know of anyone who has been able to get an even finish this way.

One manufacturer of fly-swatter handles has solved the difficulty in this manner: The handles are first stained with an aniline water solution, being dipped with wire trays and then allowed to drip and dry thoroughly. The handles are then placed in a 30-gal. steel drum, containing about a gallon of shellac substitute into which spirit stain has been mixed. The drum is then revolved for

about 35 minutes by a system of pulleys and bars welded on to each head.

A section of the drum is then removed and the handles are put into trays to become hard dry. While not absolutely waterproof, a very durable finish is thus secured which, in opacity, closely approximates the effect of enamel.

Only enough of the shellac—substitute stain is introduced into the drum to take care of the number of handles, so that there is no residue; all of the material is applied to the handles. The exact quantity to the number of handles of course, must be determined at the start from experiment.—I. F.

Refinishing Canoes.

As most canoes today are made of heavy canvas stretched tightly over a wooden frame, I assume that it is from this type of surface that G. F. H. (July Question Dept.) desires advice as to paint removal. Ordinary paint and varnish remover will serve but, as the surface is uneven, it probably will be best to first roll off the old finish with a scraper; then rub briskly with a stiff shoe brush wet with benzine, to remove all possible wax residue.

Now patch and sandpaper where necessary, and apply a priming coat composed of 5 lbs. white lead, one pint each of turpentine and spar varnish, and a tablespoonful of japan drier. This should be well mixed, applied in a good heavy coat and sanded down when dry.

After this treatment, a variety of finish coats are practicable: (1) a coat or two of good prepared paint; (2) a coat of japan color and spar varnish mixed

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equal parts; (3) any good grade of automobile enamel; (4) any of the foregoing followed by a coat of clear spar or automobile-body finishing varnish, with decorations in between.

None of these finishes will check if the priming filler coat is allowed to dry hard before the finish coats are applied. The wooden interior of the canoe may simply be refinished with spar varnish, without the necessity of removing the old finish.—D. L. W.

For the best procedure in removing old finish and refinishing canoes, would say to remove the old finish by means of a varnish and paint remover. G. F. H. does not say whether he wants to paint the canoes, or finish them in the natural color of the wood. If they are to be painted I would say, first give them a coat of pure linseed oil applied warm, allowing plenty of time for the oil to dry before painting. Use only the purest of linseed oil for this work. I suggest that because many of the oils on the market are adulterated. Use pure lead paint.

To finish in the natural color of the wood apply a coat of hot linseed oil, then finish in a varnish made specially for canoe work. Take the matter of varnish up with your supply house and they will be able to give you what you want.—O. T. Botman.

Finishing Fixtures, Etc.

In July issue Mr. A. L. Price asks about using lacquer on show cases, drug and bank fixtures, etc. It has been a practice for years, as you no doubt know, to finish bank and store fixtures with stain, followed by one or two ground coats of shellac finished off with the French polishing method. The spray is being used in this field where varnish rather than shellac alone is used, but it is confined, for the most part, to the larger concerns in this line where production methods make installation of the necessary equipment economical.

As to lacquer, the chief objection has been that the wood parts of show cases were so slender that considerable waste of material was unavoidable, as lacquer can only be sprayed. Nevertheless, where fixtures offer broad veneered surfaces, and the amount of this work is sufficient to warrant installation of the spray, lacquer will become increasingly popular.

It should be borne in mind, however, that lacquer also necessitates the use of water stain, as it is not safe to use over oil stain, even where one or two coats of

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shellac intervene. Since much of such work is called for in red mahogany, an oil stain would hardly be suitable anyway, in view of its fading tendencies.

Spraying equipment is not only being constantly improved, but it is being made more economical as well. In fact, portable equipments are now available which may be secured complete with compressors for as low as $100. Naturally they are best suited to small work or occasional jobs. A spray as small as desired can be produced with them for running around frames.

Your difficulty with enamel scaling must, from the information you give, be due to shortness of oil in the first priming coat. Either secure a primer with greater oil content, or add linseed oil to what you are using. It is assumed of course, that you are giving each coat plenty of time to dry.—O. L. M.

With enamel finish scaling off, Alvin L. Price's trouble undoubtedly lies in the first undercoat not having sufficient binder to bond it to the wood. In doing painting I have to use a priming coat which is largely oil, to form a union between the wood and succeeding coats. If Mr. Price will mix one quart of pure linseed oil to a gallon of undercoater he will find an improvement in respect to the matter complained of, but two quarts to a gallon will make it more secure. Many finishers use a priming coat of zinc white and oil. In making a priming coat of the undercoater use oil in the first coat anly.

Regarding sprays and lacquer on store fixtures, these are used where there is work enough to justify the installation of a spraying outfit. There is nothing better than lacquer for these fixtures as it is not easily marred, and some lacquers are not affected by hot water, acids nor alcohol.—W. P. Severne.

Silver Gray Stain On Steamed Wood.

E. H. S. M. Co. mention in July number of this journal about having difficulty in obtaining a good silver gray on wood, part of which is bent in a steam retort, the trouble being that the parts bent in the steam retort do not take the same shade as those not so treated.

I presume the stock is sandpapered after it is dry. I would suggest coating the whole with a solution made by dissolving 1 oz. of tannic acid in a gallon of water, and when this is dry, sandpaper to a smooth finish. The tannic acid will likely cause the gray stain to take darker than formerly, and to overcome this it may be necessary to reduce its strength somewhat. If this does not overcome the difficulty I would suggest that you take the matter up with some of the stain manufacturers, sending them a sample of the stained work, and telling them which shade you desire.—W. P. Wallace.

DeVilbiss Opens S. and S. Branch in Detroit

A Detroit Sales and Service Branch has recently been opened by the DeVilbiss Mfg. Co., of Toledo, Ohio. Occupying, at 4614 Woodward Ave., a portion of the ground floor and basement of the Garfield building, gives the DeVilbiss Co. a commodious and convenient, down-town place of business in the Michigan metropolis.

There will be carried at this branch, at all times, a display and stock of the complete DeVilbiss spray-painting equipment. Service men will also be on hand to render, without delay, all possible assistance to the large and rapidly growing group of industrial, contractor, master painter, and other users of this equipment in Detroit and nearby places.

That Motion Picture Screen.

Replying to J. M. L's. inquiry in July issue there are various procedures for producing a suitable moving picture screen, and although most of those with which we are familiar are intended for use on canvas or muslin, we see no reason why the idea cannot be worked out on a wood surface as well.

Aluminum is in common use as a final finish, but we do not just see the value of mixing it with gold. In order to avoid a too highly glazed surface we would suggest first applying one or two coats of ordinary flat wall liquid to the wood. This will give a porous texture unlike that which would be produced by enamel or enamel paint.

Another method is to apply directly to the wood, a coat of white lead in oil, thinned to brushing consistency with pure raw linseed oil. When this is hard dry apply a coat of japan gold size; as soon as this has dried, sprinkle on a layer of fine smalts or minute glass chips. This will give a pebbly finish which will absorb the glare of the projected light—the chief requirement of a good moving picture screen.—I. F.

If I understand the needs of J. M. L. aright, I would proceed as follows: Obtain the desired quantity of aluminum powder and gold (bronze) powder and mix them together thoroughly. Bronze powder is made in different degrees of fineness, and I would suggest getting the coarse. Obtain a bellows, such as is used for dusting insect powder, and into this bellows put the two powders.

The best way to prepare the screen for the powder depends on the kind of material from which it is made. If it is wood it should first be given two coats of shellac and sandpapered to a smooth surface. Remove all particles of dust and apply a medium coat of thin varnish. After the varnish has flowed out uniformly dust on the powder with the bellows.

A slightly different effect from that produced by the bellows can be made by rubbing the surface after the powder is applied, but it must be done very carefully so as not to mar the surface. The rubbing must be done with a piece of velvet wrapped tightly around a small ball of cotton or other similar material. Hold the ball tightly between the thumb and fingers of one hand and dip it in the powder, lifting as much powder as possible, then rub the surface of the screen lightly, rubbing with a circular motion. It is necessary to have plenty of powder on the velvet to prevent the latter sticking to the surface and doing injury. I would not advise the rubbing unless the effect of dusting is unsatisfactory. In any event I would suggest that you try both on a piece of wood before going ahead with the screen.

If the screen is made of sheet metal the varnish may be applied directly to it without any undercoating, the balance of the process being the same as on the wood.—L. C. Josylin.

Advancement in Pittsburg Plate Glass Organization

The many friends of C. M. Shaw, California district manager of the Pittsburgh Plate Glass Company, will be pleased to learn of his advancement to the position of assistant manager of distribution in the home office of the paint and varnish division at Milwaukee, Wis.

Mr. H. A. Hendriksen, formerly southern California manager, will be advanced to the position of district manager in charge of all California business.

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French Walnut Finish.

The French Walnut finish may be obtained simply by the use of a wash coat of shellac and natural filler, followed by a full coat of shellac and pale varnish or lacquer, or it may be necessary to bleach the veneers with a chemical solution first. This depends entirely on the natural color of the veneers, also the degree of paleness desired.

If the former method is used you have about as inexpensive a finish, both in time and material, as can be devised; if bleaching is necessary it is similar in expense to the use of a water stain. Here you can call on the stain manufacturer and you will find him more than glad to co-operate in working out an economical system for you.

Huguenot Walnut represents a reaction from the "bleached" effect of French Walnut, which many claim did not show the true beauty of the wood. Huguenot is is about midway in shade between French and standard American Walnut.—L. F. M.

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Lacquer or other materials will not stick to PROTECT-O-LAC. Instead of becoming tacky, the materials being sprayed will form a film when sprayed on PROTECT-O-LAC and may be removed by simply peeling off film and washing surface with water.

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